

Missouri Department of Natural Resources

## **Total Maximum Daily Load Information Sheet For Streams with Mercury Impairment**

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### **Waterbody Segment at a Glance:**

**Location:** Fifteen Streams and Twenty-four Reservoirs Statewide

**Pollutant:** Mercury

**Source:** Atmospheric Deposition

**TMDL Priority Ranking:** Medium

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### **Description of the Problem**

#### **Beneficial use that is impaired**

- Protection of Human Health associated with Fish Consumption

#### **Standards that apply**

- The impairment of this lake is based on the general criterion contained in Missouri's Water Quality Standards. 10 CSR 20-7.031(3)(D), which states, "Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life."

Mercury occurs in the environment through natural processes and human activity. Naturally occurring mercury is released to the environment by volcanoes, hot springs and the weathering of rock and soil. Substantial amounts of mercury can be released to the environment from human sources. Several industrial processes such as electroplating, coal combustion for production of electricity, pulp and paper manufacturing and the formulation of pesticides use mercury. Improper disposal of such mercury-containing products as thermometers and electrical switches increases the amount of mercury released to the environment. Because it can vaporize, a large amount of mercury enters the atmosphere and is deposited globally in precipitation.

Mercury affects the human central nervous system. It is considered a neurological and developmental toxicant, and it is a possible carcinogen. Mercury can accumulate to unsafe levels in commercially and recreationally important fish. Many chemical contaminants accumulate in bottom-feeding fish. However, unlike many of these other contaminants, mercury is magnified through the food chain. Therefore, predatory fish (bass, walleye and pike) have much higher levels of mercury. Of the mercury that accumulates in predatory fish, 90 to 100 percent is in the methyl mercury form, a form that is very soluble and assimilates easily into flesh. Preparing fish by skinning and trimming does not reduce the amount of mercury because it accumulates in fish muscle tissue (fillets). Cooking or drying fish can concentrate mercury levels to even higher levels.

There is no clear demarcation of safe levels for mercury in fish tissue; however, mercury levels of 0.2 – 0.3 mg/kg or greater should be considered to be a general human health risk. The amount of human health risk depends on the amount of fish eaten and the levels of mercury in the fish that are being consumed.

Based on analysis of fish fillet samples from throughout the state of Missouri, 40 specific waterbody segments have been added to the Missouri 303(d) List for mercury. Only waterbodies with data suggesting human health risk due to elevated mercury levels in fish were added to the 303(d) list; however, it is important to note that Missouri Department of Natural Resources staff believe the problem is statewide (see table and map below). In addition, the Missouri Department of Health has issued a Fish Consumption Advisory for mercury in largemouth bass throughout the state. This advisory recommends children 12 years of age or younger and women who are or may become pregnant should not eat largemouth bass over 12" in length. At least 10 other states have similar Fish Consumption Advisories. For more information on the Missouri Fish Advisory, consult the following web sites:

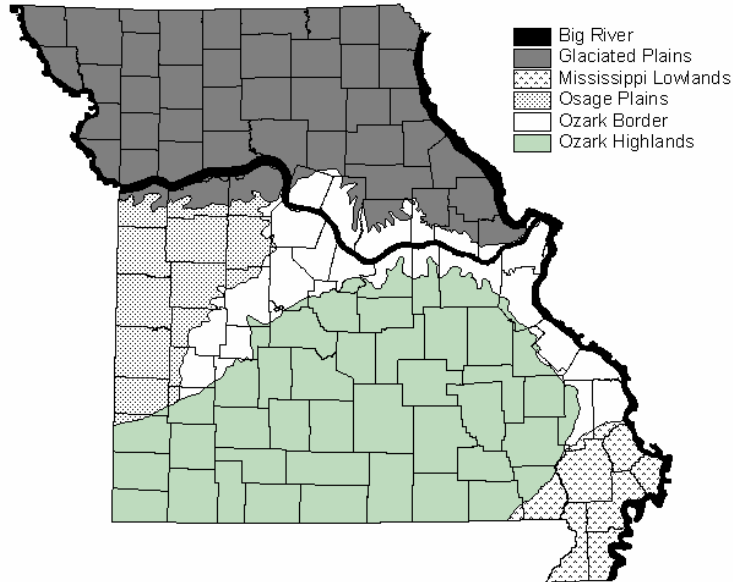
Missouri Department of Conservation: <http://www.mdc.mo.gov>

Missouri Department of Health and Senior Services: <http://www.dhss.mo.gov>

**Average Mercury Levels in Several Types of Fish in Six Missouri Aquatic Faunal Regions (See Map Below)**

DATA THROUGH 2001	Average Mercury in mg/kg (number of samples)				
	Largemouth Bass	Carp	Channel Catfish	Sturgeon	Walleye
Big River	0.337 (6)	0.101 (85)	0.117 (27)	0.116 (13)	
Glaciated Plains	0.316 (78)	0.125 (49)	0.067 (42)		.355 (2)
Mississippi Lowlands	0.300 (9)	0.023(3)	0.038 (4)		
Osage Plains	0.282 (19)	0.055 (4)	0.061 (2)		0.132(1)
Ozark Border	0.257 (81)	0.066 (39)	0.067 (30)		.194 (2)
Ozarks	0.187 (57)	0.141 (66)	0.120 (19)		.320 (5)
Statewide	0.265 (251)	0.109 (246)	0.084 (126)	0.116 (13)	0.283 (10)

## Missouri Aquatic Faunal Regions



## Waterbodies Listed for Mercury Impairment

Ben Branch Lake—Osage County	James River—Stone County, two locations
Bethany Reservoir—Harrison County	Jamesport City Lake—Davies County
Black River—Butler County	Knob Noster State Park Lake—Johnson Co.
Bluestem Lake—Jackson County	Little Blue River—Jackson County
Bourbeuse River—Franklin County	LaBelle Lake #2—Lewis County
Clearwater Reservoir—Wayne County	Lake of the Woods—Boone County
Cooley Lake—Clay County	Lamine River—Cooper County
Crowder State Park Lake—Grundy County	Long Branch Reservoir—Macon County
Deer Ridge Community Lake—Lewis County	Longview Reservoir—Jackson County
Ditch #1—Dunklin County	Mark Twain Lake—Ralls County
Eleven Point River—Oregon County	Meramec River—Franklin County
Fellows Lake—Greene County	Noblett Lake—Douglas County
Femme Osage Slough—St. Charles County	Osage River—Osage County
Foxboro Lake—Franklin County	Salt River—Ralls County
Gasconade River—Gasconade County	Schuman Park Lake—Phelps County
Grand Glaize Creek—St. Louis County	Smithville Reservoir—Clay County
Grindstone Reservoir—DeKalb County	Swift Ditch—New Madrid County
Hough Park Lake—Cole County	Weatherby Lake—Platte County
Hunnewell Lake—Shelby County	Winnebago Lake—Cass County
Indian Hills Lake—Crawford County	

**For more information call or write:**

Missouri Department of Natural Resources

Water Protection Program

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